

MISSOURI resources

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Above right: A corner guard tower at the Jefferson City Correctional Center watches over the oldest prison west of the Mississippi.
Above: An early summer storm rolls over Prairie State Park which features 3,702 acres of native tallgrass prairie.

DNB photos by Scott Myers



Front Cover: Overlooking the Missouri River six blocks from the State Capitol, the Jefferson City Correctional Center will be vacated in 2004. Redevelopment of the 144-acre parcel may rejuvenate some east-side neighborhoods.

Back Cover: A summer thunderstorm makes its way across the Missouri River bottom near Hartsburg in Boone County.

Cover photos by Scott Myers



Director's Comment

Welcome to a very special edition of our magazine. We rarely build an entire issue around a specific theme, but I wanted to share a dream with you that we've pursued for several years now - our "green building."

You're probably wondering what the green building is. I'm hoping it's our future. Not just for the department but for the State of Missouri. Someday, I hope this technology will be readily embraced by the world. Generically, a green building refers to a structure that is environmentally friendly; it promotes the beneficial reuse of existing property or structures, has energy-efficient measures built in and takes into account the impact of construction on our natural resources. More specifically, the department's green building refers to a new home for many Department of Natural Resources staff working in Jefferson City.



Almost two years ago, in October 1999, more than 100 department staff, state, local government staff and citizen stakeholders sat down together and developed the guiding principles for what they wanted this building to be.

The funding for the green building came in two appropriations. The first was used for the design phase, which is now complete. The second appropriation came from revenue bonds. By using revenue bonds rather than state general revenue, we've assured that the project will be completed.

In choosing the site, we wanted to focus on three basic principles: farmland preservation, redevelopment and reuse of existing space and green space development. We looked at 17 sites in Cole County. The one that best met all our needs was a site on the 144 acres of the Jefferson City Correction Center. Construction bids are scheduled to go out this fall.

Our building is based on sustainable technology. Light shelves will focus light deeper into the interior of the building, while shading windows and eliminating heat buildup. The carpet and flooring will have recycled

content. The concrete will use recycled fly ash from central Missouri. Another prime consideration is energy efficiency. The building will be located on a bus line to encourage public transportation use.

I agree 100 percent with Bob Berkebile, designer of our green building, who said buildings can be beautiful, improve the environment and still cost less to operate. This project can serve as a template for future State of Missouri buildings. We want to build the first green building in state government, but certainly not the last.

We'll keep you posted on progress in future issues of *Missouri Resources*.

To learn more about our green building, visit us at [www.dnr.state.mo.us] and click on Green Office Building. You also can submit letters to the editor and express your opinion on the green building. Our mail, e-mail and Web addresses are listed just to the right of this column.



KC DISCOVERY CENTER

photographs by Scott Myers

When you first walk in to the [Discovery Center in Kansas City](#), you're impressed by all the sunlight shining in. The light reflects off the natural color of the light woods inside. Large, open areas invite you to relax and to just enjoy being there. Discover ten acres of gardens, wetlands, walkways and wildlife that surround the facility, located in Kauffman Legacy Park. The "green" building houses outreach services of the [Missouri Department of Conservation](#) and the Missouri Department of Natural Resources.

We've invited both department directors to share their thoughts on how this unique partnership will open up the great outdoors in the Kansas City area.

Agencies Offer Cooperative Learning Opportunity

by Steve Mahfood

Director, Missouri Department of Natural Resources

The Missouri Department of Natural Resources is faced with many environmental challenges in preserving, protecting and enhancing Missouri's natural, cultural and energy resources. These challenges have made it necessary to expand our focus to provide outreach and assistance to Missouri citizens.

By educating communities, stakeholders, businesses, local governments, advocacy groups, not-for-profit organizations and other interested groups, we can promote and encourage urban sustainability and create a healthy and higher quality of life for



The Discovery Center is a natural retreat in the center of Kansas City. The grounds feature examples of several types of Missouri ecosystems such as this wetland.

future generations.

This year, our department has joined forces with the Missouri Department of Conservation at the Urban Conservation Campus in Kansas City, Mo., within the Kauffman Legacy Park, 4750 Troost Avenue. The Discovery Center is one of the most unique urban conservation facilities in the country - dedicated to serving and educating the urban public on environmental issues and conservation programs and activities. The architectural "green design" of the building features the integration of the philosophies of both the departments in the landscape and structure. The use of native plants in the gardens demonstrates urban landscaping options. Missouri ecosystems also are showcased ([see details in Conservation's accompanying article](#)).

Alternative energy sources also are displayed and include a geothermal heat pump, photovoltaics, low-e glazing for windows and energy-efficient lighting. An active and passive solar feature, called the Living Machine, mimics nature as it cleans

wastewater on-site and reuses treated water to flush toilets and supply the wetlands outdoors. The building materials used are environmentally safe, and using recyclable products was a very important step in closing the recycling loop. Countertops, paints, carpet squares and restroom stall partitions all were built with post-consumer recycled materials.

The Missouri Department of Natural Resources is proud and honored to be a state governmental partner with the Missouri Department of Conservation in this endeavor. Currently, our department occupies four administrative offices, a secretarial reception area, plus use of common space shared by staff from both departments. The Discovery Center has two wings - the northern wing houses Natural Resources and Conservation administrative staff. The southern wing is Conservation's education workshop (see details in Conservation's article). Interim Director Walter Pearson announced in July that Peter Shemitz of the City of Kansas City had been hired as director for the Kansas City Urban Outreach Office. Shemitz's duties will include managing the Natural Resources offices in the Discovery Center. He has an extensive background in environmental and resource conservation issues, as well as teaching experience at the University of Missouri-Kansas City.

Reaching out to urban and rural communities, especially through non-regulatory programs, is vitally important. Our agency's highly visible regulatory functions sometimes overshadow our outreach programs and efforts. One of the steps that can help change this perception is an improvement in our everyday, one-on-one interactions with the public. This is especially important on a day-to-day basis in our rural and urban settings. Providing an environmental and cultural education initiative plan in the urban areas and fostering environmental excellence and economic prosperity are priorities that the department vigorously supports.



The Teacher Resource Center distributes conservation- and environmental-related materials and advice to teachers.

At the Kansas City Discovery Center, our agency will staff an energy specialist, a cultural resource preservation specialist and an environmental specialist. An environmental manager will supervise our natural resource team. Each professional will focus in their area of expertise while working collectively on assigned projects with ours and Conservation's staff. To assist in the revitalization of our urban areas, we must educate the general public, identify new strategies in addressing natural and conservation resources in our urban cities and provide the necessary resources at the local level.

I'd like to thank Anita Gorman and her leadership on the commission, as well as Conservation Directors Jerry Conley and John Hoskins for making this dream a reality.

Steve Mahfood has served as director of the Missouri Department of Natural Resources since January 1998.

Discovering Nature in Kansas City

by John Hoskins

Director, Missouri Department of Conservation

My neighbor's seven-year-old son was watching me clean a trout recently. I was showing him how to filet the meat off the bones when I happened to mention that I caught this trout in an Ozark stream using an artificial fly.

"What do you mean you caught it?" he asked. It wasn't the question I was expecting. I

thought he might ask what kind of fly, or which stream in the Ozarks. But he was asking something more fundamental. I looked at him questioningly.

"My mom gets fish at the store. Or sometimes we go through the drive-through to get fish. What do you mean you caught it?" he repeated. Turns out this seven-year-old did not know the verb to "fish." In fact, he did not know that fish live in water.

Most of us in the natural resource field are familiar with the quote from Aldo Leopold: "There are two spiritual dangers in not owning a farm. One is the danger of supposing that breakfast comes from the grocery, and the other that heat comes from the furnace." Here was a perfect illustration of Leopold's prophecy.

The Conservation Department and the Department of Natural Resources work hard to educate the public - from pre-schoolers to senior citizens - about the state's resources. Now we have teamed up to open a facility in the heart of Kansas City to teach urban children what those resources are, where to find them and how to care for them.

The Discovery Center started with a vision by a group of conservation educators who recognized the need to bring nature into the classroom - and into the lives of its students. Its core educational experience revolves around six workshops: Woodworking for Wildlife, Nature's Palette, Exploring the Outdoors, Nature's Aquarium, Nature's Garden and Greenhouse, and Nature's Bounty.

Each workshop provides hands-on learning experiences. One day when I visited, kindergartners in Nature's Garden and Greenhouse were rolling native grass and forb seeds into balls of earth. The magic mixture clung together and, when dried, would be carefully "planted" in the miniature prairie outside on the Discovery Center's conservation campus.

Down the hall, in Woodworking for Wildlife, older kids were nailing together nest box kits to create homes for songbirds. We anticipate 30,000 students going through these workshops annually. That's a lot of nest boxes for wildlife.

The Discovery Center is located on Troost Avenue near Brush Creek. It's a highly



The Discovery Center parking lot features bioswales planted with native species that filter pollutants from parking lot runoff.

urban site, surrounded by asphalt, homes, businesses and other big buildings. But the 10-acre "conservation campus" is a haven. It captures on a small scale the native ecosystems of Missouri as Lewis and Clark may have seen them 200 years ago. Mature hardwoods create an urban forest, prairie grasses wave in the sun, and a miniature wetland attracts migrating ducks and geese. A trail winds its way through the native plantings and benches dot its route.

Indoors, one wing of the building is occupied by the workshops, while another houses a Teacher Resource Center, multi-purpose room, and offices for Conservation and Natural Resources staff. The central lobby features a spectacular mural by noted artist Michael Haynes. It depicts a scene overlooking the Missouri River near present-day Kansas City, as Lewis and Clark would have seen it in 1804. An auditorium provides space for programs, and a gift and coffee shop offers a place to peruse a book or just relax.



The Living Machine uses a system of holding tanks and plants to clean wastewater that is generated at the Discovery Center. The water then is reused and routed to toilets inside the facility, as well as a wetlands outside.

The entire development cost slightly more than \$8 million. More than half was raised through private donations from corporations, foundations and individuals. The project would not have been possible without the timely participation and more than \$1.1 million of financial support from the Missouri Department of Natural Resources. The Conservation Department is grateful for the vision of Natural Resources Director Steve Mahfood, who saw in the Discovery Center the potential for hands-on resource conservation education in an urban environment.

Our staffs are working together to provide services never before offered in urban Kansas City. Visitors can sign up to receive our agencies' free publications, the Missouri Conservationist and Missouri Resources. They can find out where to go camping, hiking, hunting and wildlife viewing, and ask questions about seasons, bag limits and other regulations. They can pick up tips for managing the wildlife and natural ecosystems in their own

backyards, not to mention their own "back 40." They can learn what to do about the squirrels that have taken up residence in their attic, how to build a birdhouse for their favorite bird, or how to attract butterflies to their garden.

And, they can learn the meaning of the verb, to "fish."

John Hoskins became director of the Missouri Department of Conservation in July 2002.



Recycling Glass:

Costs Cut Sharply Into Profits

Although glass is considered by most consumers to be an obvious candidate for recycling, the fact is that glass can be very difficult to market. Part of the problem is keeping the public educated about the recycling collection process. Another factor is that breakage is almost inevitable in either drop-off bins or during transport. This causes much of the glass to be commingled with contaminants that find their way into the recycling bins or trucks.

Crushed glass containers, known as cullet, are used primarily in the glass container industry to make new containers. But glass is a relatively heavy material so the cost to transport it is usually higher than its actual recycling value.

Other markets for cullet are as fiberglass products, abrasives in sandblasting, as aggregate in road construction to produce "glasphalt," in reflective paints and as frictionators used for lighting matches. The primary colors in recycled glass are clear, brown or green. Mixing them may contaminate the cullet and reduce its value. Debris such as Pyrex, ceramics, rocks or window glass also are contaminants.

More than 80 percent of glass container waste is generated in homes. Yet, only 26.6 percent of the United States' production of 2.94 million tons of glass is recycled. Industry refills many bottles to boost the recycling rate to 35 percent. Missouri markets for cullet are limited at this time, however, products that can be made close to waste-glass sources or products that have a higher market value may be the answer to the glass recycling dilemma.

Two potential uses for glass tie in with the Missouri's green office building

theme. Glasphalt has been used for roads, parking lots and airport runways in Missouri. What makes this a viable market is that the waste glass can be used locally and can contain small amounts of contaminants. Another building product, decorative tiles, can be manufactured from waste glass and have the potential to be marketed at a price that cover the higher transportation and processing costs.



Letters

First I would like to thank you for your very good article in [Missouri Resources Magazine, Summer 2002, Vol. 19, No. 2](#). The article about the mercury pollution in our lakes especially got my attention. I live on Table Rock Lake and was aware of the black bass warning but since you mentioned predator fish, I became concerned about eating walleye, trout, white bass, and some catfish that are all predator fish.

What is the official Missouri position on these predator fish and is there any danger in children eating them?

I would appreciate your response to this question because I know of many children eating these fish and if there is any danger we need to get a warning out for these fish as well.

Paul M. Harris
Reeds Spring

Editor's Note:

Unfortunately, we do not have the data we need to make a definitive statement. The Missouri departments of Health and Senior Services, Conservation and Natural Resources have coordinated to collect and analyze a large number of fish samples over the last two decades. We do not yet have enough samples to justify expanding the fish consumption advisory. We do plan to increase data collection for walleye and flathead catfish. For now, the data suggest all other Missouri sport fish have mercury concentrations well below the levels of health concern. Should the monitoring warrant, the advisory will be expanded.

Your [summer 2002 magazine](#) was a great issue and I read it cover to

cover. I found the article on mercury in the environment interesting. I am aware that mercury appears to be a growing problem in the environment and in the fish I like to eat. I'd like to relate a recent experience. I had a new HVAC system installed in my house. I asked the contractor what to do with the old mercury thermostat. I assumed they recycled or had a safe disposal process. Nope! I was told they just drop 'em in the trash. I asked them to leave it and I would handle it. That makes two thermostats I have until I can find a safe way to dispose of them. Any ideas?

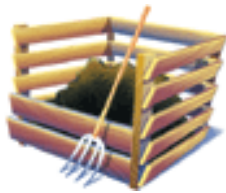
Joe Tousignant
Jackson

Editor's Note:

Currently, there are very limited collection sites for mercury thermostats. A grant to assist with this is planned for 2003.

Letters intended for publication should be addressed to "Letters," *Missouri Resources*, P.O. Box 176, Jefferson City, MO 65102-0176 or faxed to (573) 751-6860, attention: "Letters." Please include your name, address and daytime phone number. Space may require us to edit your letter. You also can e-mail *Missouri Resources* staff at moresdnr@mail.dnr.state.mo.us

News Briefs



Elk River Compost Project Gets Grant

The U.S. Environmental Protection Agency (EPA) has awarded the Department of Natural Resources' Environmental Assistance Office (EAO) a \$257,460 grant to demonstrate the economic and environmental feasibility of using poultry litter to produce compost for markets in areas in need of additional nutrients.

In recent years the Elk River Watershed in southwest Missouri has been the site of explosive growth of both the human and avian population. This growth has provided much-needed economic stimulus, but it also has resulted in the production of large amounts of waste that must be properly managed.

Three local agencies, Neosho FFA, the University of Missouri's Southwest Center and the Missouri Department of Transportation's Neosho office have agreed to operate composting sites and participate in demonstrations of litter use and marketing.

Currently, litter is applied to land near the poultry barns where it is produced. Over-application and misapplication of litter has resulted in phosphorus contamination in surface-water bodies within the watershed. Excess phosphorus in water leads to algae blooms that can deplete oxygen levels ending in fish kills. They also cause taste and odor problems in drinking water.

Due to its bulk and low value, transporting raw litter to areas in need of crop nutrients is not feasible. Composting the litter will reduce its bulk and eliminate objectionable qualities. The resulting material will have a higher value and be more economical to transport. Opportunities to add value, such as processing for retail sales and creating recognized labeling should enhance economic feasibility of turning the waste litter into a

marketable commodity.

EPA funded the grant through the Clean Water Act Section 319 Nonpoint Source Management Program. EAO is advised and assisted in the project by an advisory committee made up of representatives from several other department programs.

Local Government Workshops Offered

The Department of Natural Resources' Environmental Assistance Office is offering an environmental training workshop, the Environmental Management Institute (EMI), at four separate locations this fall. EMI is a two-day workshop that features a variety of environmental and government-related topics. Local government officials, city administrators, water or sewer system district managers, decision-makers, consultants and other assistance providers will find this workshop a unique opportunity to enhance their environmental knowledge and stewardship. The workshops offer up-to-date information on issues pertinent to Missouri cities, towns, villages, as well as to unincorporated areas.

Topics presented at the workshops include Planning, Public Meetings, Sunshine Law, Drinking Water, Wastewater, Hazardous Waste, Solid Waste, User Charge Analysis, and Stormwater. There is a registration fee for EMI, but scholarships are available. Dates and locations of the remaining sessions this year are Sept. 11-12, Cape Girardeau; Oct. 9-10, Maryville; Oct. 23-24, Excelsior Springs; and Nov. 13-14, Rolla.

For additional information on the workshops or to obtain the registration forms, visit our home page at [www.dnr.state.mo.us/oac/lgov.htm] or by phone at 1-800-361-4827.

Backpacking on the Ozark Trail



If you are looking for an outdoor adventure this fall, consider the 14th annual Ozark Trail Backpacking Adventure Oct. 12-19. Experienced guides will lead the seven-day adventure on the Wappapello Lake and Victory sections of the Ozark Trail in southeast Missouri north of Poplar Bluff. The 52-mile hike will let participants explore one of the most scenic areas of Missouri during the peak of the fall color season.

The cost for the trip is \$180 for the full week, and \$90 for a half week for members (\$200 and \$100 for non-members). Included is transportation from St. Louis, a motel room (for full week), trail shuttle, experienced leaders, t-shirt, Ozark Trail patch, maps, information packet and evening meal on Saturday, Oct. 12. A \$50 deposit is required and the balance is due by the registration deadline of Oct. 1. Registration after Oct. 1 will include a \$25 late fee.

The adventure is sponsored by the Hosteling International American Youth Hostels in conjunction with the Ozark Trail Council. Fifty percent of all proceeds will be donated to the Ozark Trail Council for maintenance of the trail. The Ozark Trail is a unique cooperative effort between state and federal agencies, private landowners, and trail users to develop a trail that goes from the St. Louis area to the Missouri border with Arkansas and beyond.

For more information, call or e-mail Gateway Council office of Hosteling International at (314) 644-4660 or info@gatewayhiayh.org.

Compliance Goal of New Program

The Missouri Department of Natural Resources is initiating a program to encourage businesses, local governments, state agencies, educational institutions and other organizations to develop plans for improving their environmental performance.

The program, called the Missouri Environmental Management Partnership (MEMP), encourages organizations to develop an environmental management system (EMS). An EMS is a voluntary process through which an organization designs a plan that addresses its environmental issues.

Although participation in the MEMP is strictly voluntary, partners would be held to generally recognized EMS conformance criteria, including a commitment to regulatory compliance as well as broader environmental goals. Various recognition and regulatory incentives will be available to organizations that are accepted as partners in the program.

The partnership program will be initiated during the fall of 2002 with public announcements and presentations to interested groups and organizations. Applications for the program will be accepted beginning later in the year.

Water Resources Report Released

The Missouri Department of Natural Resources' Water Resources Program has released its 2002 Missouri Water Resources Law Annual Report as an electronic edition on the department's Web site at [www.dnr.state.mo.us].

The new report focuses on wetland and hydrologic research projects, including a remote sensing wetland identification study, and a computer hydrologic calibration study for Total Maximum Daily Loads (TMDLs) for impaired waters. It also reports on how the department's Land Reclamation Program remediates acid mine drainage, and how the rules of the Hazardous Waste Program prevent water contamination. In addition, the emergency response and laboratory functions of the department's Environmental Services Program, and the erosion and sedimentation abatement efforts of the Soil and Water Conservation Program are summarized. Up-to-date information on underground storage tanks and groundwater level monitoring wells are included.

The annual reports are produced in accordance with state law that mandates water resources planning in Missouri. The illustrated water law annual reports have been issued since 1996. Anyone desiring a paper copy should call the department's Geological Survey and Resource Assessment Division at (573) 368-2125.

Lewis and Clark State Historic Site Added



One hundred and ninety-eight years after it was explored, a site recorded in the journal of William Clark in 1804 will become Missouri's newest state historic site, thanks to the generosity of a Jefferson City couple.

Property near the confluence of the Missouri and Osage rivers in Cole County has been donated to the Missouri Department of Natural Resources by William and Carol Norton of Jefferson City. The 13-acre site will be known as the Clark's Hill/Norton State Historic Site. The acquisition was official on June 1, 2002, 198 years after Clark visited the site.

"This donation by the Nortons will give the Missouri state park system an important site in the department's efforts to interpret the Lewis and Clark Expedition during its 200 anniversary and beyond," said Stephen Mahfood, director of the Department of Natural Resources. "We are pleased that the Nortons have helped us preserve this site and make it available to the public."

The Lewis and Clark Expedition arrived in the area on June 1, 1804. The hill on the property overlooking the Missouri River is believed to be the hill that William Clark climbed while camped at the mouth of the Osage River. His journal noted that the hill was more than 100 feet high and afforded a "delightful prospect" of both rivers.

Plans for the site include a parking area, trail and overlook with interpretive information. The department has received preliminary approval from the National Park Service for a \$50,000 Lewis and Clark National Historic Trail 2002 Challenge Cost Share Grant to assist with the development.

With the acquisition of Clark's Hill / Norton State Historic Site, the Missouri state park system now has 83 parks and historic sites.

Pregracke Accepts Cleanup Award

Chad Pregracke, a previous *Missouri Resources* Honor Roll Award recipient, recently received the prestigious National Jefferson Award for Public Service for his ongoing campaign to rid the Missouri and Mississippi rivers of trash.

Pregracke, a 27-year-old native of East Moline, Ill., joined Bill and Melinda Gates and Rudolph Giuliani in receiving the award from the American Institute for Public Service at a June ceremony in Washington, D.C. He received the award for Greatest Public Service by an Individual Thirty-Five Years or Under for his cleanup efforts.

Shortly after receiving the award, Pregracke set out his largest cleanup effort to date by coordinating more than 1,000 volunteers in cleaning up 43 miles of the Mississippi River from Prescott, Wisc., to Minneapolis, Minn.

Pregracke's group, Living Lands and Waters, will be coordinating efforts in Hartsburg Sept. 28 and in St. Charles Oct. 12 as a member of Missouri River Relief. Both events will be preceded by school tours of the barges and equipment used in the cleanup, along with interactive presentations by various agencies and groups, as well as an educational forum. Teachers interested in receiving a Missouri River Cleanup Teachers Packet and registering for the educational forum should contact Bryan Hopkins in the department's Outreach and Assistance Center at (573) 751-2452.

In October 2001, hundreds of volunteers filled a barge with debris during

a cleanup of the Missouri River from Rocheport to Hartsburg. Since 1997, Pregracke-organized efforts have removed an estimated 400,000 pounds of trash from the two rivers.

Westphalia New Population Center



The Highway 63 commuter parking lot at the north end of Westphalia in Osage County now has more to offer its users and visitors than just parking spaces and a scenic overlook. It has a new monument. An inscribed brass marker mounted in concrete designates it the center of population for the state of Missouri.

Every 10 years the Census Bureau calculates the center of population after completion and tabulation of the census results. The center of population for Missouri is determined as the place where an imaginary, flat, weightless, rigid map of the state would balance perfectly if all Missouri residents were of identical weight. The previous location for the center of population for Missouri was in Cole County.

The Missouri center of population is not to be confused with the national center of population, which is near Edgar Springs in Phelps County. The Edgar Springs site also has a monument. These monuments are part of a national system of survey reference points used for land measurement and engineering projects.

On Saturday, June 22, 2002, the Missouri Society of Professional Surveyors, assisted by the Missouri Department of Natural Resources' Land Survey Program, sponsored a ceremony at the parking lot to commemorate the placing of the monument.

"Now that the monument is in place, surveyors from the division's Land Survey Program will make a series of highly accurate measurements to determine the precise geographic position of the brass monument," said Mimi Garstang, division director and State Geologist. "The monument will allow surveyors and engineers a position of reference for their work in and around Westphalia. People who use GPS receivers may want to visit the monument and can verify their instruments by obtaining technical data from the division's Land Survey Program."

"We see the center of population project as an opportunity to showcase our work to the public," said Dan Lashley. "Surveying is a profession that uniquely combines expertise in mathematics, science, research, land and

geography. This project reflects the broad base of knowledge and work that surveyors provide to the citizens of Missouri."

For additional information call (573) 368-2300.

Halmich Donation Makes a Point



The Missouri Department of Natural Resources' Geological Survey and Resource Assessment Division (GSRAD) has received an impressive collection of Native American stone artifacts donated by Estell Darwin Halmich of Bourbon. The collection includes about 200 pieces, including spear points, dart points, arrow points, knives, scrapers, drills, and adzes.

Halmich began collecting artifacts in east-central Missouri in 1929. The collection represents his lifelong passion for hunting artifacts in the hills and valleys of the Ozarks. He donated his collection to the division because he wanted the collection to stay intact, and he wanted it to be displayed in a place where school children could view it.

Each year, hundreds of school children and adults tour the instructive exhibits of minerals, rocks, fossils, and maps that are housed in GSRAD's Rolla headquarters building. In the near future, visitors will also be able to view Halmich's equally instructive collection of artifacts.

Halmich's collection ranges in age from the Paleo-Indian Period (10,000 BC) to the Mississippian Period (AD 1400). Projectile point styles, from oldest to youngest, include Clovis, Dalton, Graham Cave, Osceola, Etley, Langtry, Snyders, Scallorn, Sequoia, Reed, and Cahokia. Most of the points are composed of various Missouri cherts, but a few are composed of Missouri rhyolite. The adzes are composed of diabase, an igneous rock.

The division intends to display the artifacts in an archeological manner that chronicles man's dependence on industrial minerals. Industrial minerals are the nonmetallic, mined commodities that promote development and sustainment of civilization. Limestone is an example of an extremely important modern industrial mineral. It is used to manufacture lime, Portland cement, and aggregate.

Without limestone, we would not have buildings, roads, and bridges, as we know them today. Halmich's artifacts demonstrate, however, that ancient man depended heavily on a different industrial mineral, one that is not used much anymore and that mineral is chert (flint), which breaks with a sharp edge. Ancient craftsmen shaped chert into a variety of tools

for cutting, piercing, drilling and scraping.

Missouri's New Drought Plan

A new drought plan for the State of Missouri has been released by the Missouri Department of Natural Resources.

It replaces the 1995 Missouri Drought Response Plan. The 2002 plan provides coordinated guidance for state and federal agencies during drought conditions. It also provides guidance for preparing for drought, and is part of the State Emergency Operations Plan of the State Emergency Management Agency, Department of Public Safety.

The plan describes Missouri's susceptibility to drought and lists the various local, state, and federal agencies that are able to help in planning for, evaluating, and responding to drought conditions. The drought plan, which is in a book format, provides many helpful pointers that will be beneficial to water suppliers. The plan is a product of the department's Water Resources Program and was prepared as part of the state water planning process. Other Missouri State Water Plan volumes discuss various uses of water, rather than a lack of water.

To obtain a copy of the 2002 Missouri Drought Plan call (573) 368-2125 or visit the department's Web site at [www.dnr.state.mo.us].

Microfinish Wins EPA Honor



Microfinish Company, Inc., a metal finisher in St. Louis, has achieved Silver Level performance on the St. Louis Strategic Goals Program's Performance Ladder. The Strategic Goals Program (SGP) is a national program developed by the U.S. Environmental Protection Agency (EPA) to help metal finishers achieve environmental excellence. Metal finishers in the SGP work to achieve specific environmental goals that include reductions in water usage, sludge generation, energy usage and emissions and increased metals utilization. As metal finishers achieve these goals, they improve their environmental performance, realize cost savings and are awarded certain regulatory and assistance benefits. In order to be awarded Silver Level, Microfinish had to meet 60 percent of the goals. In fact, they achieved 92 percent of the goals, almost achieving Gold Level. They will now begin receiving Silver Level benefits such as reduction of wastewater inspections from the Metropolitan St. Louis Sewer District (MSD) and reduced self-

monitoring frequencies to federally mandated minimums.

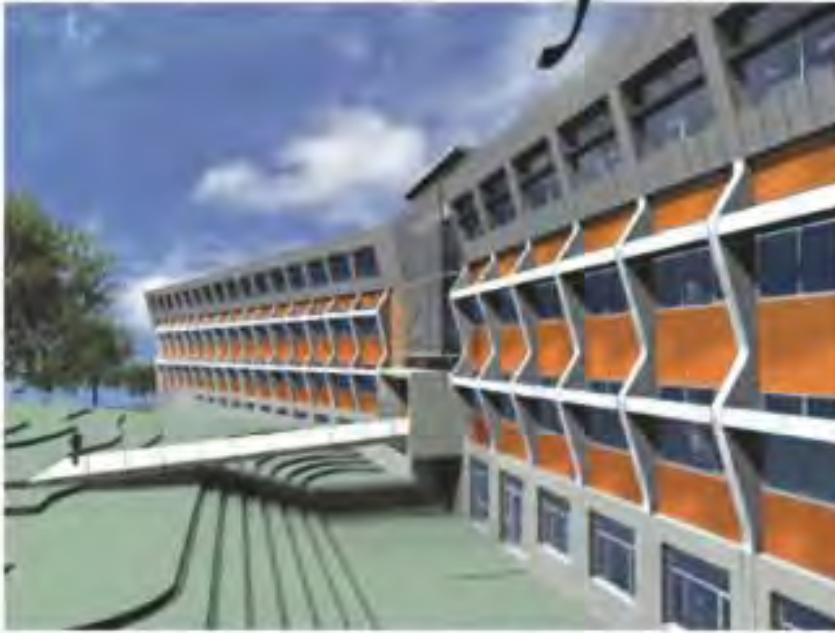
For more information about the St. Louis Strategic Goals Programs, contact Gene Nickel of the Environmental Assistance Office (EAO) at 1-800-361-4827 or (573) 526-6627. In St. Louis, contact Nancy Morgan at (314) 340-5900.

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One Last Word

A Matter of Will by Bob Berkebile



The exterior profile of the green office building helps capture and reflect light into the building significantly reducing the need for interior lighting.
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During a presentation to the U.S. Senate Committee on Environment and Public Works last April, I happened to witness a scene that prompted my curiosity and made me reflect on the state of environmental awareness in today's society. There we were, ready to present and debate the status of sustainable thinking and design in America. But alas, Houston, we had a problem – five different laptops, five different software programs and five different hardware connection needs.

with a name suggestive of the leaps and bounds technology offers across systems, a “kangaroo,” solved all our technical requirements in minutes. Meanwhile, senators and their staff were using cellular phones to communicate with the outside world, bypassing boundaries of space and time.

It occurred to me that if Thomas Jefferson had been present in the room, he would no doubt have been struck by the advances in technology that give us instant contact with virtually anyone in the world, while Jefferson's hand-written communications delivered by horse or ship required days or months. On the other hand, as an architect, he might

Then, a tiny microchip

be concerned by the fact that today's buildings and communities look much as they did when he designed Monticello over 200 years ago.

The technology required to create facilities that reduce energy consumption and pollution while dramatically reducing operating costs is now a reality. Our homes, offices and public buildings can, in fact, generate their own energy, treat their own wastes, make us and our neighborhood healthier and more efficient, host landscapes that purify air and water and include transportation systems that are fueled by hydrogen.

"We must be the change we wish to see in the world."

— Mahatma Gandhi

As scientists inform us daily on the connections between our behavior and the decline of our environment, why don't we change? Why don't we use our knowledge, resources and technology appropriately? I came away from the Dirksen Senate Office Building that day with no definite answer but remembering something the late Buckminster Fuller taught me in the 1960s: "The only way to make significant change is to make the thing you're trying to change obsolete," Fuller used to say.

Suddenly I was encouraged. Back home, organizations like the Learning Exchange, the Missouri Department of Conservation and the Department of Natural Resources are leading us in making this change. Facilities such as Earthworks, the Urban Conservation Campus Discovery Center in Kansas City and the Natural Resources' green office building in Jefferson City will educate users and visitors alike about the connections between the design of our buildings and communities, and the vitality of our environment.

These facilities do make the old technology obsolete and are blazing new trails that get us closer to a richer and more restorative relationship with nature. They also will cost Missourians less to operate while making the users healthier, happier and safer. I also remember Gandhi's advice, and I wonder if I have the will to make the next level of change in my life. And how about you?

Bob Berkebile is a founding partner of Berkebile, Nelson, Immenschuh and McDowell Architects (BNIM), Kansas City. Recognized nationally for its work in sustainable design, BNIM was chosen as the design firm for the Department of Natural Resources' [green office building](#).

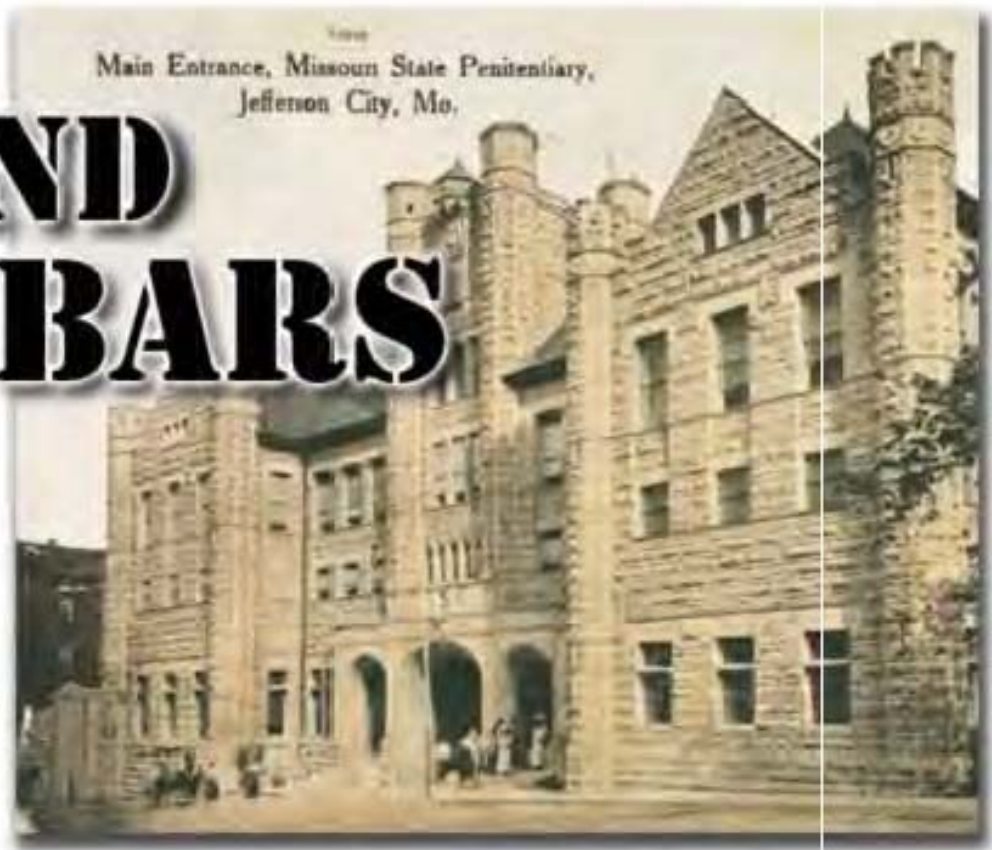
BEYOND THE BARS

What's Next for the
Oldest Prison West
of the Mississippi?

by Jane Beetem

A postcard depicts Housing Unit 1, which was originally built in 1905 as the women's prison and administration building. This building is now partially obscured by a 1936 addition, and may be returned to its original appearance during redevelopment of the prison.

Postcard from Missouri State Museum



The Walls. J Triple C. The Big House. The Pen. Known by many names over the years, the Jefferson City Correctional Center (JCCC) was established in the 1830s as the Missouri State Penitentiary. Since that time, the penitentiary has played a significant role, albeit not always a comfortable one, in the history and development of Jefferson City. When the correctional center relocates east of Jefferson City in 2004, redevelopment of the former prison will continue to shape the community. The new prison will be known as the Jefferson City Correctional Center, so the name of the former prison will revert back to Missouri State Penitentiary. Located just six blocks from the State Capitol, on a bluff overlooking the Missouri River, the 144-acre prison site represents the greatest opportunity for redevelopment in Jefferson City's central core in our lifetimes.

Missouri's General Assembly approved establishment of the penitentiary in 1833, and the first prisoner arrived at the four-acre site in eastern Jefferson City in 1836. The legislature was reluctant to fund the cost of incarcerating prisoners and made several attempts to lease both the prison property and the prisoners to private operators during the first few decades. These efforts were plagued by frequent prisoner escapes. During the 1870s, the prison expanded as the state built factory buildings within the walls for lease to manufacturers, who then

contracted for prison labor to run them.

This system proved highly profitable to the owners of the companies, many of whom built stylish houses on East Main Street (now East Capitol Avenue). By 1900 the prison had expanded to over 2,000 prisoners on 15 acres. The practice of contracting for prison labor was discontinued in 1915, but the impact of this practice persisted, as shoe factories continued to be a major part of Jefferson City's thriving economy.

The Work Projects Administration (WPA) helped construct a number of buildings at the prison in the 1930s to relieve overcrowding; by this time, the area within the walls had increased to 47 acres. Buildings continued to be added to the prison complex until 1982, including replacements for some of the seven buildings destroyed during the riot of September 1954. This rampage lasted 15 hours before prison guards and state troopers regained control. Violence continued into the 1960s, when the complex was called "the bloodiest 47 acres in America," and calls for replacement of the prison began to be heard.

On Jan. 15, 1998, the late Gov. Mel Carnahan announced that his annual State of the State address would contain a request for funding to replace the Jefferson City Correctional Center with a new maximum security prison facility. Former warden Don Wyrick was later quoted saying, "I think it would be a shame to tear it down ... Sure it's old, but stone and steel don't wear out ..."



The Master Plan drawn up by the JCCC Task Force in November 2000 divides the prison into six areas for redevelopment.

Source: State Office of Administration / Parsons, Harland, Bartholomew & Assoc. Inc.

To plan for future disposition of the prison property, the JCCC Redevelopment Oversight Committee and Task Force were formed in September 1999. The Oversight Committee comprised 10 state and local representatives, including the Department of Natural Resources, and an equal number representing Jefferson City and Cole County interests. Members of the task force had an opportunity to tour much of the complex and then began the decision-making process by ranking planning values in order of importance. The top three planning values identified by the task force were cost effectiveness, historic preservation and community acceptance or compatibility.

The task force then considered over 40 potential uses for the complex, determining that the

most desired uses were a riverfront park, Missouri State Prison Museum and a historic site.

Approximately 50 existing buildings and historic features were ranked in priority order: Housing Unit 4, Housing Unit 1, Housing Unit 3, upper yard wall and towers, and the gas chamber.

Housing Unit 4 is the oldest building remaining at the prison. Built in 1868, this imposing stone structure has extremely thick stone walls defining the cells, with no partitions in the center of the building.

Housing Unit 1 was originally built in 1905 as the women's prison and administration building. A circa 1930s addition has been added to the front of this building, although most of the building's front facade (see lead photo) remains intact.

Housing Unit 3 was designed by Warden McClung and built of stone in 1915. The decorative tower motifs flanking the central entrance reflect the design of the original guard towers, part of the stone walls surrounding the upper and lower yards. The gas chamber, constructed of stone in 1937, served as Missouri's method of capital punishment until 1989.

The AIA Missouri, a State Council of the American Institute of Architects, sponsored a planning charrette April 7-9, 2000, in Jefferson City to generate redevelopment concepts for the prison property. Eight teams of volunteer architects, engineers, real estate professionals and others received a limited tour of the prison and information from the task force the first day, then spent 12 hours preparing their presentations the second day. Each team was allotted two presentation boards on which to illustrate their ideas. On the third day, the teams presented their plans to the entire group, as well as a panel of nine distinguished visiting critics. The critics provided comments on the presentations, as well as giving advice on how the state and the local community should proceed in redevelopment of the prison property.

During this time, the Department of Natural Resources assembled an internal team of 11 members to develop a concept for redevelopment of JCCC. This proposal identified three major areas within the prison: Historic Site with adaptive reuse, Chestnut Valley and Minor's Hill Park Reclamation Area and Open Space Park. This team presented its finding to the Department of Natural Resources. Director Steve Mahfood agreed with the team's recommendations. "Redevelopment of the prison property is a great opportunity to demonstrate reuse of an urban brownfield," said Mahfood. "This project will also encourage growth and redevelopment of the neighborhoods near Jefferson City's downtown." The task force received a copy of this proposal, and it was published along with the other charrette teams' submissions.

The group used the information from the charrette and its previous decisions in development of a Master Plan for prison redevelopment. This plan outlined six recommended uses for areas of the prison: Judicial Center Area, Historic Area, Community Area, Landing Area, Entertainment Area, Office Area and Natural Resource Area (see graphic). The Historic Area includes the stone buildings that form the core of the prison, plus the gas chamber. The upper and lower yards were designated the Community Area, while the

Landing Area was envisioned as a walkway providing pedestrians a closeup view of the Missouri River, plus possible connections to rail services and excursion boats. The area at the end of and just west of Chestnut Street was identified as the Entertainment Area, including the Shoe Factory building, two circa 1930s brick factories and the Potato House. Missouri State Surplus property currently occupies much of the area designated for redevelopment as the Office Area. To the east of the road leading to State Surplus, bounded on the southeast by Riverside Drive, is the Natural Resource Area. The final version of the Master Plan was presented to the Oversight Committee for approval on Nov. 16, 2000. Since that time, refinements have been made to the Master Plan as plans develop for adaptive reuse of existing buildings and construction of new buildings onsite.

Another decision reached by the task force was that final disposition of the prison property should be managed by a separate redevelopment entity, with representation by the state, city and county. House Bill No. 621 was passed by the legislature and signed by Gov. Bob Holden on July 12, 2001, establishing the Missouri State Penitentiary Redevelopment Commission. In March 2002, ten members were appointed to the commission by state, county and city leaders. Steve Roling of Kansas City was nominated as chairman by the Governor in April 2002, and all members were approved by the Senate during this spring's fiscal year 2002 legislative session.

The JCCC Redevelopment Task Force met with the Missouri State Penitentiary Redevelopment Commission at their first meeting on July 23, 2002, as a way to transition from one group to another. After the meeting, Chairman Roling commented on the Master Plan: "... there's a consensus in this town about this good work. So I'm sure we'll follow most, if not all of what the plan has been so far." It is hoped that this leadership in redevelopment of the area will refocus attention on Jefferson City's central core.

The following resources were referenced: Jefferson City Correctional Center Redevelopment Plan Charrette Program Book, April, 2000; "The Prison Against the Town: Jefferson City and the Penitentiary in the 19th Century," Missouri Historical Review, Gary R. Kremer and Thomas E. Gage, July, 1980; National Register Nomination, "Lester S. and Missouri "Zue" Gordon Parker House," Jane Beetem, 2000; Jefferson City News Tribune articles, February, 1998, March 6, April 24 and July 25, 2002; and St. Louis Post-Dispatch, Jan. 15, 1998.

Jane Beetem is the department's coordinator for JCCC redevelopment issues.



Original stone guard towers were round, reminiscent of a Medieval castle. Some of the towers may be completely restored. DNR photo by Scott Myers.

MISSOURI resources

Fall 2002 • Volume 19 • Number 3

Resource Honor Roll



Wanda Eubank, CCWWC general manager,
Elizabeth Grove and CFM past-president
Forrest "Ike" Lovan

Mark Twain Lake Water Project Saluted

The Clarence Cannon Wholesale Water Commission (CCWWC) provides drinking water to several communities in northeast Missouri. The commission operates a drinking water treatment plant located on Mark Twain Lake. The raw water intake is on the North Fork arm of the lake, so the plant's water ultimately comes from the watershed of the North Fork of the Salt River. This watershed drains 400,640 acres - or 626 square miles. Good-

quality raw water is essential to provide good-quality drinking water and efforts needed to be focused on the North Fork Watershed.

In September 1999, the group received a 319 Nonpoint Source Pollution Grant from the Missouri Department of Natural Resources. and hired Wanda Eubank, an information and education specialist. There were many stakeholders, communities and government groups in the watershed that shared the same concerns as the CCWWC. Eubank's first task was to provide information, resources, and training about water quality issues, the impact of the community on watershed health and community-based efforts to plan and manage water quality issues in the watershed. A steering committee, ongoing workshop development and presentations, an annual conference, and a newsletter keep the group informed and connected. Stakeholder involvement also created a Watershed Restoration Action Strategy that identifies problems and solutions for the North Fork Watershed and serves as a guide.

The Conservation Federation of Missouri (CFM) recognized the CCWWC as its 2001 Conservation Organization of the Year for its outstanding efforts to protect water quality. "The project would not have been a success if it had not been for the dedicated partners that are involved. We are very pleased that so many good people

have given their time and talents to achieve a common goal, and we look forward to continued involvement by those partners in the future," Eubank said. The list of partners includes the cities of Moberly, Paris, Newark, Shelbina and Unionville, county commissions from Knox, Monroe, and Shelby counties, health departments from Marion and Shelby counties, the Mark Twain Solid Waste Management District, and the Regional Council of Governments. Soil and Water Conservation Districts from Knox, Macon, Monroe and Shelby counties and the Missouri Association of Soil and Water Conservation Districts are project partners. Others include the Missouri Corn Growers, U.S. Army Corps of Engineers, Department of Natural Resources' Northeast Regional Office, Department of Conservation, Natural Resources Conservation Service and the universities of Missouri and Iowa State.

When local and regional constituents and groups work together toward common goals, success is inevitable. When the goal is clean, quality drinking water, the importance is inestimable.



Anita Gorman
MDC photo by Cliff White

Anita Gorman **Perseverance, Purpose**

The efforts and accomplishments of Anita Gorman on behalf of the Missouri Conservation Commission are legendary. The Quincy, Ill. native has served with distinction as the first and only woman appointed to the commission. A Republican, she was appointed in 1993 and reappointed by the late Democratic Gov. Mel Carnahan. Nine years later, she is anything but retired as she still serves not only in that capacity but also as a fund-raiser and zealous advocate for the Missouri Department of Conservation and its broad mission. Any biography also will tell you that Gorman was a teacher, economist, computer programmer and consultant as well.

Gorman learned the ways of the outdoors early on her parents' Depression-era farm in Marion County. The impression that depleted soil and vanishing wildlife left on her have lasted a lifetime. She told the Minneapolis Star Tribune in 2001 that her family worked doggedly back in those days to help start a conservation commission. Decades later, she helps drive the very commission her family was determined to establish. Gorman also was a popular member of Kansas City's Parks and Recreation board and current Liberty Memorial Association board member. Among her many honors are included such personal recognitions as the Greater Kansas City Citizen of the Year, Missouri Parks Association Citation Award, Kansas Citian of the Year by the Missouri Press Association and Distinguished Civic Service Award by Baker University.

Several of Gorman's efforts have benefited the Department of Natural Resources in their environmental, parks, wetland and outreach efforts. Gorman is widely acknowledged as the person most responsible for the initiation and completion of the

new Kansas City Discovery Center (see page 10 of this issue). She not only had to convince the Conservation Commission of the project's importance, but took it upon herself to garner around 40 percent of the \$10 million price tag needed to make that urban dream a reality. Gov. Bob Holden said the Discovery Center would not have become a reality ... "without Anita Gorman staying with it every step of the way." More than once, the Kansas City Star has lauded not only her efforts on behalf of their city, but as an invaluable asset to the state through the many boards and commissions on which she has served throughout the years. Her involvement and influence on natural resource project successes are endless. Many are well-known across the state such as the establishment of the venison donation program for needy families, education partnership with the Kansas City Zoo, damaged Missouri flood plains property acquisitions, 8,000- and 4,000-acre wetlands restorations, Columbia Bottoms Conservation Area at the Missouri-Mississippi confluence, MoDOT native wildflower planting program in state highway right-of-ways and the establishment of the Runge Conservation Nature Center in Jefferson City.

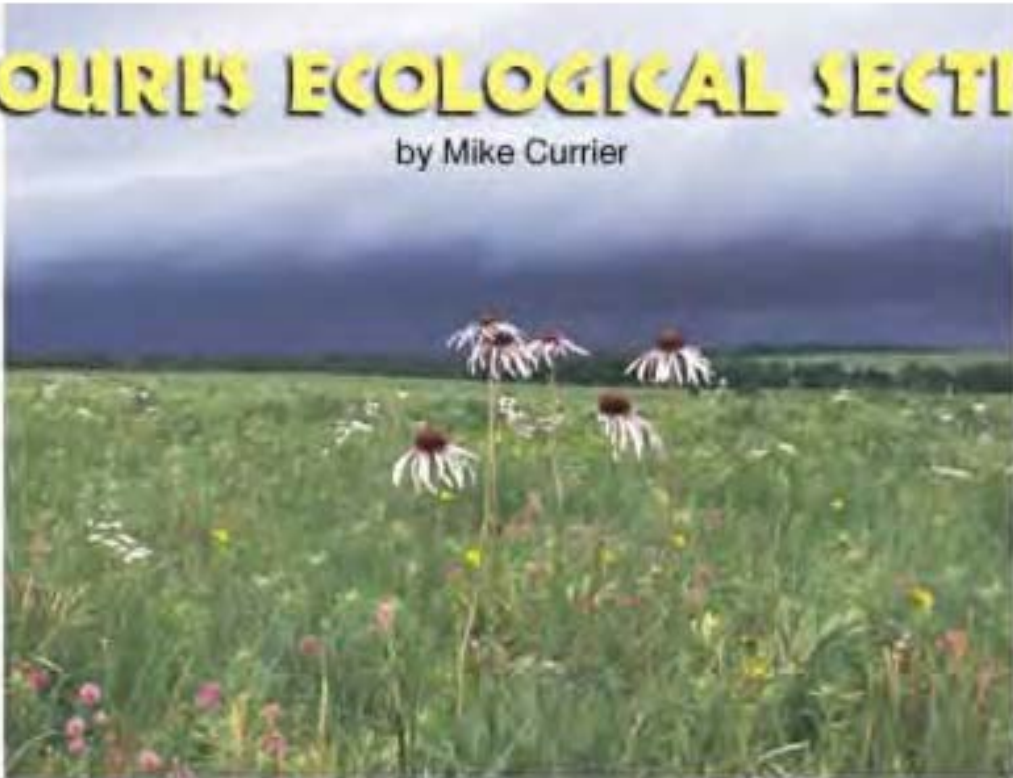
If Anita Gorman's two daughters and five grandchildren carry but a flicker of the torch Mom carries, conservation, natural resource protection and education will be well-tended in the Show-Me State for decades to come.



Resources to Explore

MISSOURI'S ECOLOGICAL SECTIONS

by Mike Currier



Pale purple coneflowers are one of the many wildflowers that can be seen in the Regal Prairie Natural Area in Prairie State Park. The park's 10 miles of trails provide access to four different natural areas where lucky visitors may catch a glimpse of prairie chickens or see bison grazing in their natural habitat. *DNR photo by Scott Myers.*

Editor's Note: *This is part two of a four-part series recognizing the 25th anniversary of the Missouri Natural Areas Program. Part three will be published in the fall issue of Missouri Resources. The Missouri Natural Areas Program is a cooperative effort by state and federal agencies, conservation organizations, local governments, corporations and private citizens to protect some of the state's best examples of natural communities. The program is jointly administered by the Missouri Department of Natural Resources and the Missouri Department of Conservation with representation by the U.S. Forest Service and the National Park Service. Today, the Missouri Natural Areas Program includes 178 natural areas totaling 56,861 acres. Thirty-nine areas totaling 16,600 acres are located in Missouri state parks.*

The Midwestern region of the United States consists of large areas of land that are of similar geologic origin and have similar topography and climate. These ecological sections, thousands of square miles in size, extend beyond the borders of states, reflecting areas with similar potential vegetation and land use. To a large extent, these sections influence who we are and what we do because of the land uses they provide.

Missouri incorporates parts of four broad ecological sections: the Osage Plains, Ozark Highlands, Central Dissected Till Plains and the Mississippi Lowlands. This is one reason why our state is so diverse. Missouri natural areas provide opportunities to experience natural landscapes representative of these different ecological sections. In recognition of the 25th anniversary of the Missouri Natural Areas Program examples are featured. Natural Areas are recognized as outstanding examples of natural landscapes, significant biological resources and remnants of our natural heritage. They serve as benchmarks of natural integrity that are valuable for scientific research, nature-based education and passive recreation. Perhaps most important is what these areas provide in connecting us to our land-based heritage.

OSAGE PLAINS ECOLOGICAL SECTION

Hunkah, Tzi-Sho, Regal and East Drywood Creek Natural Areas, Prairie State Park, Barton County (690 acres total).

The Osage Plains occupies 18,100 square miles extending from Missouri into Kansas and Oklahoma. It is characterized by a series of southwest to northeast trending ridges (or cuestas) formed by rock outcrops separating gently rolling plains with less than 100 feet of relief. Historically, the Osage Plains was once 70 percent tallgrass

prairie with occasional groves of oak trees.

The upland prairie graded into wet bottomland prairie including sloughs, freshwater marshes and mixed bottomland forest.

Hunkah Prairie, Tzi-Sho, Regal and East Drywood Creek Natural Areas at [Prairie State Park](#) are located within a larger prairie preserve (3,702 acres) dedicated to the restoration of tallgrass prairie. The park supports a number of rare plants and animals listed in Missouri as species of conservation concern including the northern harrier, Henslow's sparrow and the greater prairie chicken.

There are more than 10 miles of trails providing access from which bison and elk may be observed browsing nearby or on the distant horizon.

OZARK HIGHLANDS ECOLOGICAL SECTION

Mudlick Mountain Natural Area, Sam A. Baker State Park, Wayne County (1,370 acres).

The Ozark Highlands encompasses 270,000 square miles extending from Missouri into Arkansas and Oklahoma. It consists of a rolling to highly dissected plateau that supports oak-hickory or oak-pine woodlands and forest, bottomland forest, small prairies and glades formed on limestone, dolomite, sandstone, or igneous-derived soils. The Ozark Highlands is noted for its unique karst topography with a high concentration of caves, springs and groundwater seepage wetlands.

Located in the Ozark Highlands, Mudlick Mountain Natural Area at [Sam A. Baker State Park](#) is widely recognized for its old growth igneous woodlands, clear streams and outstanding vistas. The central dome of Mudlick Mountain is one of the highest in Missouri, rising 900 feet above Big Creek Valley below. Most of the area is underlain by Mudlick Dellenite, an extrusive igneous rock from volcanic origins dating back over one billion years. The northern end of Mudlick Mountain is dissected by Big Creek, which forms one of Missouri's largest and deepest canyonlike gorges with numerous shut-ins, igneous glades and sheer bluffs falling abruptly 400 feet to the creek below. Trails provide access into the area where pure stands of shortleaf pine, Missouri's only truly



The boardwalk trail at Big Oak Tree State Park leads through the Missouri state park system's only cypress swamp.
DNR photo by Tom Nagel

native pine occur.

Other representative natural areas of this section include the St. Francois Mountains Natural Area ([Taum Sauk Mountain State Park](#)), Johnson's Shut-Ins Fen Natural Area ([Johnson's Shut-Ins State Park](#)), Meramec Mosaic Natural Area ([Meramec State Park](#)), Coakley Hollow Fen Natural Area ([Lake of the Ozarks State Park](#)), Ha Ha Tonka Savanna Natural Area ([Ha Ha Tonka State Park](#)), Pickle Creek Natural Area ([Hawn State Park](#)), Elk River Breaks Woodland Natural Area ([Big Sugar Creek State Park](#)). Much of the diversity of the Missouri Ozark Highlands is represented from the St. Francois Mountains in southeast Missouri to the Elk River watershed in the southwest part of the state.

CENTRAL DISSECTED TILL PLAINS ECOLOGICAL SECTION

Locust Creek Natural Area, Pershing State Park, Linn County, (330 acres).

The Central Dissected Till Plains covers 36,100 square miles and parts of five states (Missouri, Iowa, Illinois, Kansas and Nebraska). It is characterized by moderately dissected, glaciated, flat to rolling plains that slope gently toward the Missouri and Mississippi river valleys. As much as 25 feet of loess covers most uplands; sandstone, shale or limestone may be exposed in the deeper valleys. An estimated 60 percent of the land surface was originally tallgrass prairie, with burr oak and white oak savannas interspersed and in transitional areas. Historically, upland oak-hickory woodlands and savanna occurred on more dissected land, grading into bottomland forests and woodlands with a mosaic of wet prairie, freshwater marsh and wetlands occurring along rivers.

Locust Creek Natural Area has one of the few and highest quality naturally meandering streams and wetland complexes in this section. The associated wet prairies and forests harbor 41 species of aquatic fauna including two listed in Missouri as species of conservation concern. The wet bottomland and riparian forests provide habitat for red-headed woodpeckers, prothonotary warblers, and orchard orioles. More than 2,000 acres of wet prairie, freshwater marsh, shrub swamps, oxbow ponds and woodlands are managed in addition to the natural area. An interpretive boardwalk and riparian trail provide access to this wetland.

Other natural areas representative of the Central Dissected Till Plains include the Lincoln Hills Natural Area ([Cuivre River State Park](#)), the Des Moines River Ravines Natural Area ([Battle of Athens State Historic Site](#)), Oumessourit Natural Area ([Van Meter State Park](#)), and Bee Trace, ([Long Branch State Park](#)) a proposed natural area.

MISSISSIPPI LOWLANDS ECOLOGICAL SECTION

Big Oak Tree Natural Area, Big Oak Tree State Park, Mississippi County (940 acres).



Locust Creek Natural Area in Pershing State Park is a rare, high-quality example of a naturally meandering stream wetland complex. Butterweed is a common plant that grows in the fresh water marsh zone in the natural area. DNR photo by Scott Myers

The Mississippi Lowlands has an area of 44,300 square miles including parts of Missouri, Arkansas, Tennessee, Mississippi and Louisiana. The area consists of lightly to moderately dissected alluvial plains. Local relief in most of the section ranges from 0 to 100 feet. The predominant vegetation is bottomland forest consisting of bald cypress and oak. Oak-hickory woodlands occur on some of the adjacent uplands. The vegetation has a distinct Gulf Coastal Plains influence. Sand prairie and sand woodland remnants support a suite of rare species listed in Missouri as species of conservation concern. In Missouri, less than 1 percent of the original Bootheel wetlands remain.

Since its inception, [Big Oak Tree State Park](#) has been described as the “park of champions” for the large old-growth trees that characterize its wet bottomland forests. Big Oak Tree Natural Area consists of a mosaic of wet bottomland forests and cypress swamp that supports 200 species of plants, 150 species of birds and 100 mammals, fish and reptiles. A boardwalk provides access into the interior of what can only be described as a primordial forest of

extreme rarity.

In addition, [Morris State Park](#), while not a natural area, includes remnants of the sand prairie that once typified this section.

For more information on natural areas in Missouri state parks or a copy of the free Natural Areas Directory, call the Missouri Department of Natural Resources toll free at 1-800-334-6946 (voice) or 1-800-379-2419 (Telecommunications Device for the Deaf).

Mike Currier is natural resource steward for the Department of Natural Resources' Division of State Parks.



Sustainable Design

Putting the Green Stamp on a Template for the Future
by Larry Archer

When it comes to building design, Bob Berkebile has only one color on his palette - green.

Berkebile, a principal in the Kansas City architectural firm BNIM Architects, has been referred to as the "godfather of sustainable design." The expertise and enthusiasm that earned him that title also earned his firm the design contract for the Missouri Department of Natural Resources' new "green office building" in Jefferson City, which is slated for construction in late 2004. While Berkebile embraces sustainable, or "green," design concepts, he rejects the godfather title.

"My opinion is that centuries ago, we were doing sustainable design," he said.

In early, pre-industrial civilizations, people structured their homes and lifestyles to take advantage of the environment and create a sense of community. Today, sustainable design uses processes and technologies that also work with nature and create a sense of community - both inside and outside of the building. The department's four-story, 120,000 sq.-ft. green building will anchor the 144-acre Jefferson City Correctional Center (JCCC) site redevelopment.



The new green office building will be a model of sustainable design that incorporates environmentally friendly features that reduce heating and cooling costs, maximize natural light, conserve water and greatly reduce the building's overall environmental impact. copyright © 2002 BNIM Architects

The building will be located east of the prison near the current Missouri State Surplus Property building and will serve as a buffer between the prison redevelopment and an undeveloped wooded area.

Following a design process that drew input from more than 70 individuals and took the best of existing green buildings, BNIM incorporated environmentally responsible decisions from site selection to carpeting. The design makes the most of natural lighting, efficient heating and cooling systems and water conservation to lower operational costs and environmental impact (see sidebar).

For a state agency whose mission is "to preserve, protect, restore and enhance Missouri's natural, cultural, and energy resources," pursuing green building design for its next home seemed to be a "physical manifestation of our values," according to Department of Natural Resources Deputy Director Jeff Staake.

To ensure that the building would embrace its green identity, the department sought Leadership in Energy & Environmental Design (LEED™) certification. LEED™ certification, administered by the U.S. Green Building Council, rates projects based on five criteria: site sustainability, energy and atmosphere, indoor environmental quality, material and resources, and water efficiency.

"A building of this nature clearly coincides with our mission," Staake said.

Conventional wisdom in the real estate business is that there are three keys to success - location, location, location. Similarly, location of the facility was vital in meeting its green mission, part of which was adopted for the entire state. Governor Holden in December 2001, signed Executive Order 22 directing that state buildings be located in central downtown areas. The governor recognizes that the economic strength of central downtowns throughout the state is important to the economic vitality of the state as a whole. Placement of state buildings and facilities in the central downtown or revitalization districts of urban cores can improve their economic health and the stability of the urban population.

For the department, the site chosen had to meet three criteria: it could not be prime farmland; it had to allow the building to have an axis to the sun, and it had to meet the characteristics of Smart Growth, one of which is the placement of buildings in urban cores. An ad hoc committee within the Department of Natural Resources reviewed 17 sites before deciding on the prison redevelopment area, according to Dan Walker, director of the department's General Services Program. "You have the natural area on one side of you and redevelopment - smart growth - on the other side. It's the best of both worlds," Walker said.

Designed to be inviting to the public, the building will serve as a tool to promote green design. Design elements, both within the building and on the grounds, will be labeled to explain their green aspects. A gallery within the building will consolidate and explain all of the features. Staake foresees the classroom function of the building being informative and fun. "Being the first project, we have high hopes that we can set the tone for the rest of the redevelopment."

Striking the balance between economic viability and environmental responsibility weighed heavily in the process, Staake said. "We wanted to make sure as a management team that this was just the first green state building and not the last," he said. "We felt like we had an obligation to the state to design a template for future state building projects."

In doing so, the department was forced to make "investor-grade decisions," in order to change the prevailing mindset within the state's design and construction community that



The Deramus Education Pavilion at the Kansas City Zoo was designed by BNIM, the same firm that is designing the new green office building, and is based on many of the same principles of sustainable design. Photo courtesy of BNIM Architects. copyright © 2002 Mike Sinclair

environmentally sensitive and cost efficient are mutually exclusive.

One such investor-grade decision was to limit untested or experimental technologies in favor of proven off-the-shelf technologies whose benefits can be reproduced in future state buildings.

However, just

because the technology is not cutting edge does not mean that the building lacks innovation, Berkebile pointed out. "We may be integrating systems that haven't been integrated before, but all of the components have been used before," he said.

In fact, many of the green elements designed into the building are already in use in other parts of Missouri. In many regards, the Kansas City Discovery Center, a joint venture between Natural Resources and the Missouri Department of Conservation, reflects several of the concepts that will go into the Jefferson City building, including materials selection and the improved use of natural light, Berkebile said. In St. Louis, increased interest in sustainable design has boosted the U.S. Green Building Council - St. Louis Regional Chapter, to 120 members.

Berkebile sees the growth in sustainable building design not only as socially responsible today, but economically essential tomorrow. His firm, with a grant from the Packard Foundation, found that higher initial construction costs of green buildings quickly pay for themselves, and the payback gap continues to shrink - making the idea even more mainstream. The department's green office building, as a functioning classroom and a result of sustainable design practices, will further that cause.

Berkebile added, "DNR, I think, can be a major factor in making people embrace this technology."

Larry Archer is a public information coordinator for the department's Outreach and Assistance Center.

Eco-Friendly Features Highlight Efficiency

The designers of Natural Resources' green office building have seen the light. Now they want to share that light with everyone who will work there.

Maximizing natural lighting while minimizing the heat transfer associated with direct sunlight is just one of the innovative design features that make the department's proposed green office building environmentally responsible and economically efficient - or green.

From the selection of its site right down to the carpet on the floor, the department's new home will be an example of the most current innovations in environmentally friendly building design. These features generally fall into the following categories: sustainable site, energy and atmosphere, materials and resources, indoor environmental quality, and water efficiency.

Sustainable Site

The building's location east of the Jefferson City Correctional Center will anchor the site's redevelopment in the coming years. The site was chosen based on several criteria, including its orientation to the daily path of the sun and its proximity to public transportation and the city's urban core. Another factor in its selection was the topography, which will allow the site to be landscaped to minimize, if not eliminate rainwater runoff.

Energy and Atmosphere

By orienting the face of the building to the southern path of the sun, the building will take advantage of natural sunlight to provide lighting to up to 90 percent of the building's occupants, a concept known as daylighting. Light shelves and sun shades protrude from the side of the building and perform two functions: reflecting sunlight deeper into the building's interior and shading external windows during the most extreme summer sun angles. By capturing and reflecting light into the building, the light shelves decrease the amount of energy used for electric lighting by replacing it with natural lighting.

By shading the windows with the southern exposure, the light shelves prevent heat transfer into the building's interior. The building's mechanical system, which



Daylighting is a central feature of green design. In the new Discovery Center in Kansas City, it reduces the energy needed to light and cool the building.
DNR photo by Scott Myers

provides the heating, ventilation and air conditioning, is designed to be up to 56 percent more efficient than a baseline, energy code-complying mechanical design. It incorporates standard pieces of equipment in innovative configurations. All the mechanical systems are sized for the task, rather than oversized, as is often the case in traditional design. The mechanical systems are integrated with electrical systems and automatically adjust for reduced cooling loads due to natural, rather than electric lighting.

Materials and Resources

Whenever possible, materials with high recycled content will be used. Everything from the concrete to the carpet is expected to have recycled content. Materials manufactured regionally are also given greater consideration in order to reduce transportation energy usage. The interior of the building also is being designed with drop chutes in order to encourage paper recycling by employees. In some cases, materials will

be reused from other sites. The old women's prison, which is located on the site, will be "deconstructed," with the bricks being used in the construction of the outdoor amphitheater, benches and several other landscaping applications.

Indoor Environmental Quality

The raised flooring system within this green facility will allow individual employees to better control the heating and cooling within his or her work area by changing the adjustable floor register in the workspace. Materials also are being chosen that exceed national standards for decreased indoor air pollutants. The natural lighting mentioned above also plays a considerable part in improving indoor environmental quality.

Water Efficiency

Rainwater from the roof will be captured and stored in a cistern for flushing toilets. Water-saving fixtures such as waterless urinals will be installed to improve water efficiency. The site's landscaping will feature native Missouri plants, which will require less watering during Missouri's hot summers. They will filter and clean water as it is absorbed. Paving stone will replace asphalt where possible.

MISSOURI resources

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On September 5, 1960, members of the St. Louis Under-Water Recovery Team gathered in front of Big Spring in Carter County for a group photo. They had spent the day scuba diving to remove cans, bottles and other trash from the spring.

With an average daily discharge of 278 million gallons, Big Spring is the largest

in Missouri and one of the largest in the world. It also was one of Missouri's first state parks. Created on Oct. 17, 1924, the remote spring saw few improvements until between 1934 and 1937 when the Civilian Conservation Corps opened a camp at the park. The CCC constructed cabins, built roads and installed stonework. In 1972, Big Spring State Park, along with Alley Spring State Park and Round Spring State Park, was added to the Ozark National Scenic Riverways and is now administered by the National Park Service. *DNR archive photo*

Send your photo to "Time Exposures," c/o [Missouri Resources](#), P.O. Box 176, Jefferson City, MO 65102-0176. All pictures will be returned via insured mail. Pre-1970 environmental and natural resource photos from Missouri will be considered. Please try to include the time and location of the picture, a brief description and any related historic details that might be of interest to our readers.



Teacher's Notebook



The EarthWays Home

An Urban "Green" House

by Jean Ponzi
photographs by Scott Myers



As Darnell Roy from the Lift for Life Academy pedals the Energy Bike, Margaret Lilly, an education coordinator, demonstrates to his classmates the connection between energy production and energy efficiency.

The students crowd closer, watching the bicycle and cheering for their classmate as he pedals furiously. "More power!" cries the group's adult leader. "Pedal harder!" But the boy is getting nowhere.

He's riding the Energy Bike, so a stream of electrons is the only thing racing from the generator on his stationary bike through wires connected to an electrical display, where a row of 40-watt incandescent light bulbs is barely glowing. Explaining how electricity is produced in relation to consumer demand, their leader switches the current to a row of equivalent-wattage compact fluorescents. As

these efficient bulbs power up easily, lights flash on in the circle of young faces, getting the message of this activity: "Efficiency means we need to use less energy!"

This school group is touring the EarthWays Home, where efficient use of natural resources is demonstrated in a household context. Displays in the kitchen, garden, living room, basement and bathroom emphasize reducing personal demands on the environment while enjoying a comfortable standard of living.

A Recycled House with an Energetic Message

Located in mid-town St. Louis, the EarthWays Home is a handsome Victorian residence, built in 1885 and renovated in 1994 to model innovations in green building principles and practices. Scheduled tours, meetings, trainings and monthly open house days bring professionals from all fields, as well as school groups and the general public, into this learning environment. The home also serves as headquarters for the Gateway Center for Resource Efficiency, a division of the Missouri Botanical Garden.

Operation of the EarthWays Home, and expansion of its teaching and outreach capabilities, enables the botanical garden to expand upon its mission to promote biodiversity and environmental health through knowledge about plants and natural systems. Peter Raven, Ph.D., director of the

Missouri Botanical Garden, said, "We are implementing programs through the EarthWays Home that will sustain us today without sacrificing prosperity for future generations, programs that are focused on each person's responsibility to manage our limited resources and to protect the diversity of life on our planet."

Learning from Cycles

Visitors see how the sun's energy, harnessed in photovoltaic electricity, powers appliances in the EarthWays Home kitchen. That same luminous energy supports a wealth of life outdoors, cycling oxygen, carbon dioxide and nutrients in the EarthWays Home garden. Here, the choice of plants native to Missouri creates lush habitat for birds and animals, even in the heart of the city, using little water. Liquid circulating through a network of underground pipes uses the earth's year-round constant temperature as the ground-source basis for climate control in the building. These practical examples of natural cycles are models for human activity that can minimize waste and destruction of natural resources and systems.

Some lessons are even more fundamental. A child riding the Energy Bike literally functions as a power plant, demonstrating how electricity is generated. A special lid on the toilet tank pipes fresh water filling the tank over a miniature hand-washing basin, so students and adults alike experience where water comes from and how it might be used more effectively. Use of carpeting, clothing, notebooks, "plastic lumber," tile and other products made from recycled materials illustrates the value of treating waste as a resource. Food scraps fed to earthworms in a vermicomposting bin fertilize garden plants.

Resources for Teachers

Activities and features in the EarthWays Home support Missouri's Show-Me Standards for elementary and secondary education, with pre- and post-visit activity options correlated to

statewide learning goals in science, math and social studies. Environmental topics addressed during tours include recycling and use of recycled-content products, energy efficiency, water conservation and a variety of other low-impact and non-toxic options for construction, remodeling, landscaping and everyday maintenance.

Resources for classroom study of energy efficiency are accessible online through the U.S. Department of Energy at [www.eren.doe.gov/education/lesson_plans.html]. Students can explore energy usage in their own homes or school buildings through audit activities available at [homeenergysaver.lbl.gov/].

Group tours of the EarthWays Home can be scheduled by contacting gateway.center@mobot.org or 314-577-0220. Case studies of student recycling leadership projects, and more about the EarthWays Home, can be found at [www.mobot.org].

The Missouri Department of Natural Resources provides financial support for educational materials and programs in the EarthWays Home, which offers Missourians practical tools for sound resource management. Just as enjoyment of our state parks can form bonds of stewardship for the natural world, a visit to the EarthWays Home develops knowledge that leads to environmental citizenship.

Jean Ponzi is a program manager specializing in recycling with Missouri Botanical Garden's Gateway Center for Resource Efficiency in St. Louis.



Built in 1885 and renovated in 1994, the EarthWays Home is a model of green building principles.